ACTION MEMORANDUM – RV1

DATE:

SUBJECT: Action Memorandum for an Emergency Removal Action at the Holy Trinity Cemetery Site, Lewiston, New York

FROM: Eric M. Daly, On-Scene Coordinator
Response and Prevention Branch

TO: Walter E. Mugdan, Director
Emergency and Remedial Response Division

THRU: Eric Mosher, Branch Chief
Emergency and Remedial Response Division, Response and Prevention Branch

Site ID: A23M
SIMS No: NYN000206698

I. PURPOSE

The purpose of this Action Memorandum is to document the decision to initiate an emergency response action described herein as the Holy Trinity Cemetery Site (Site) located at 5401 Roberts Avenue, Lewiston, Niagara County, New York. On **(INSERT DATE)** the On-Scene Coordinator ("OSC") requested and was granted verbal authorization pursuant to the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") to initiate an emergency response action at this Site. Authorization was granted by the Director of the Emergency and Remedial Response Division ("ERRD"). A total project ceiling of $X0,000 was authorized, of which $X0,000 was for mitigation contracting.

II. SITE INFORMATION

A. Site Description

Site Name:	Holy Trinity Cemetery
Superfund Site ID ("SSID"):	A23M
NRC Case Number:	Not Applicable
CERCLIS Number:	NYN000206698
Site Location:	Block XX, Lots XX 5401 Roberts Avenue, Lewiston, NY 14092
LAT/LONG:	43.149329°, -79.031809°
Potentially Responsible Party ("PRP"):	Union Carbide
NPL Status:	Not Listed
Removal Start Date:	April 18, 2016

B. Site Background

1. Removal Site Evaluation ("RSE"): Removal Site Evaluation

Concepts
Elements within the periodic table are comprised of both unstable and stable forms. Unstable elements are known as known as "radionuclides," and give off radiation in the form of a wave (i.e. gamma radiation) or particle (e.g. alpha radiation or beta radiation) to become more stable. The time in which radionuclides becomes stable can range from seconds to billions of years. Long-lived radionuclides, such as uranium and thorium, have always been present within the Earth's crust for millions of years and within the tissues of all living species. Material that

contain radionuclides in natural form is known as Naturally Occurring Radioactive Materials, or commonly referred to as "NORM" and contribute to background radiation levels. Examples of NORM include sands, clays and soils, rocks, coal, groundwater, oil and gas, as well as, metal ores and non-metal minerals.

Many radionuclides within NORM may become concentrated or exposed to the accessible environment as a result of human activities such as manufacturing, mineral extraction, or water processing. This is known as Technically Enhanced Radioactive Material or "TENORM." EPA has described TENORM as any:

"radiological, physical, and chemical properties of the radioactive material have been concentrated or further altered by having been processed, or beneficiated, or disturbed in a way that increases the potential for human and/or environmental exposures."

When companies began extracting precious metal and/or rare earths material from ore, companies had little suspicion that the principal minerals being mined or processed contained TENORM in the waste and/or product of the material being extracted. As a result, radioactive waste at mines and mineral processing/manufacturing facilities were often regarded as non-hazardous material and were disposed improperly. The majority of companies, including Union Carbide of New York, saw opportunities to recycle waste to businesses within their area as fill dirt for projects including road construction and parking lots. The Site is one location where contaminated fill dirt was used to construct two proposed road beds. Currently, the Site encompasses X parcels located at 5401 Roberts Avenue, Lewiston, NY.

Terminology

To evaluate land and/or buildings potentially contaminated with radioactive materials, a variety of instrumentation must be used. When performing a scoping survey, the extent of contamination (i.e. how far is the contamination on the Site), as well as, the intensity of radiation (i.e. which areas/locations contribute to the greatest risk or dose) must be identified. Hand held and portable equipment such as a sodium iodide detectors, Geiger Mueller counter, proportional detectors, and/or ion chambers maybe used as a field equipment to determine the extent of contamination and/or dose or exposure rates due to gamma radiation. In general, most of these equipment are used qualitatively and compared to background readings to determine the extent and intensity of contamination, in addition to, answering if further investigation is needed. Examples of units used for qualitative measurements at the Site include counts per minute (cpm) for contamination, micro-Roetgen per hour (μR/hr) for exposure rate, or millirem per hour (mrem/hr) for dose rate measurements.

In most cases, the equipment used to collected qualitative measurements may not give an accurate or precise quantity of contamination due to poor efficiencies for specific radionuclides, poor geometries due to the instrumentation setup, and fast counting time. Qualitative measurements should always be paired with quantitative data when characterizing a site contaminated with radioactive materials. Quantitative data can be used to verify or correlate the qualitative instrumentation reading to quantitative soil sampling. This is commonly referred to as "ground truthing." Examples of quantitative measurements are samples, such as air, water, sediment, soil, and/or vegetation samples, taken from areas of known or suspected contamination and analyzed by a laboratory. The units for quantitative measurements are in units of picoCuries per gram (pCi/g). For the Site cleanup, only quantitative measurements are used to give definitive results and to verify cleanup has been completed.

Site History

In a 1978 U.S. Department of Energy (U.S. DOE) aerial radiological survey, more than 15 properties throughout the region were identified as having elevated levels of radiation above background. It is believed that, in the early 1960s, slag from the local Union Carbide facility was used as fill on the properties prior to paving. The slag contained sufficient quantities of uranium and thorium to be classified as a licensable radioactive source material.

Union Carbide subsequently obtained a license from the Atomic Energy Commission (now the Nuclear Regulatory Commission) and the State of New York; however, the slag had been used as fill throughout the Niagara Falls region prior to licensing. Based on the original survey and subsequent investigations, it is believed that the radioactive Union Carbide slag was deposited at the Holy Trinity Cemetery property.

In February 1980, the New York State Department of Health (NYSDOH) Bureau of Radiological Health and the Niagara County Health Department conducted a radiological survey of the Holy Trinity Cemetery site to identify areas of elevated radioactivity as a result of radioactive slag having been used on the property for fill. The survey was conducted based on information that the slag used at the cemetery was from the same source used at two other locations in nearby Niagara Falls, which had been identified by the NYSDOH as containing elevated levels of radioactivity. During the survey, cemetery personnel showed NYSDOH a slag pile located near the caretaker's garage in the western portion of the property. Cemetery personnel stated that this slag was used as fill for the cemetery roads throughout the property.

Additionally, the slag was used as fill for the base of two proposed roadbeds that extended approximately 500 to 600 feet from the caretaker's garage northwest toward Robert Avenue. At the time of the survey, the construction of these roads had been abandoned. The underlying slag base was covered with an unknown amount of soil and was left as an open field. Using an Eberline PRM 7 radiation meter, radioactivity of the slag pile was measured at 250 microroentgens per hour (μR/hr); readings along cemetery roads ranged from 5 μR/hr (i.e., background concentration) to 30 μR/hr. Readings along the abandoned roadbeds ranged from 200 μR/hr to 400 μR/hr. Samples of the slag were collected as part of the investigation; laboratory analyses of the samples indicated detectable concentrations of potassium-40, uranium-235 and -238, radium- 226, thorium-232, and one other isotope. In October 2006, the New York State Department of Environmental Conservation (NYSDEC) and the Niagara County Health Department conducted a site visit at HTC. At that time, the slag pile that previously had been observed near the caretaker's garage was no longer on site; the current caretaker had neither knowledge of the slag pile, nor what happened to it. The caretaker also indicated that children living nearby use this area for recreation. Since the 1980 NYSDOH site investigation, trees had grown through the abandoned slag roadbeds, pushing the slag to the surface. As part of the site visit, NYSDEC conducted a radioactivity survey with an Exploranium GR-135. Readings taken while walking along the roadbed indicated levels of 200–450 μR/hr at waist height and a surface contact reading of 450–570 μR/hr; a contact reading of 700 μR/hr at exposed slag near a tree was documented. NYSDEC collected four samples of the slag; the samples were analyzed for isotopic uranium and isotopic thorium, and underwent gamma-ray spectroscopy analysis. Laboratory analytical results indicated the presence of uranium-238/234 ranging from 114 to 1,664 picocuries per gram (pCi/g) and thorium-232 ranging from 114 to 898 pCi/g.

In May 2007, NYSDEC visited the site to identify contamination in an on-site debris pile using gamma-ray spectroscopy. A 5-minute static reading was taken; radium- 226 was the only nuclide identified. An additional similar analysis was conducted on one of the roadbeds, confirming the presence of thorium-232.

During a July 2013 NYSDOH reconnaissance, screening activities showed radiation levels at the HTC site along the roadway and along the back roadway leading to offsite with radiation levels up to 51 μR/hr in the roadway with the pressurized ion chamber (PIC) and up to 50,000 counts per minute (cpm) with the sodium iodide (NaI) 2x2 detector.

December 2013 USEPA Pre-Remedial Program conducted radiological surveys of the exterior of

both parcels and confirmed previous work performed by NYSDEC and NYSDOH. See Attachment C for gamma survey of the exterior surface of the Site. To quantify the contamination identified, a total of 14 soil samples (including one environmental duplicate sample) were collected from 13 boreholes throughout the main footprint of the Site using hollow-stem auger drilling methods. Two soil samples were collected on the property to document background conditions. Per the "2013-2014 EPA Pre-Remedial Assessment Report," the maximum concentration of the radionuclides of concerned were Ra-226 at 360 pCi/g and Ra-228 at 303 pCi/g from slag samples.

During the Pre-Remedial assessment, the term "slag" was used to designate the first foot of soil comprising of mainly rock-like and/or clay-type material that could easily be crushed into a fine powder. The slag was shown to have the highest concentration of Ra-226, Ra-228, U-238 on the Site and exhibited the great contribution to exposure rates and dose rates to the public. During Removal Action assessment, soil samples were taken along the perimeter of the Site and were taken at various depths from surface to three feet. In general throughout this document the term "soil" sample has been used to for both slag and non-slag soil samples. For samples specific to the Pre-Remedial Assessment, the term "slag" is used only for the first foot of soil containing rock-like and/or clay-type material.

From July 2015-August 2015, the USEPA Region 2 Removal Program conducted further radiological assessment of the interior and exterior of the property. The goal for this assessment was to determine the extent of contamination (i.e. how far does the contamination extend beyond the contamination area of concern determined by Pre-Remedial Program in 2013), as well as, determine interior contamination impacts (i.e. are workers/patrons exposed to elevated levels of radon/thoron or loose contamination).

The interior of the chapel/apartment/garage building was surveyed. There were no elevated gamma readings above background observed within the interior of the structure.

USEPA Region 2 Removal Program took a total of nine (8) soil samples including one environmental duplicate sample. Eight (7) boreholes were collected throughout the perimeter of the Site using hollow-stem auger drilling methods. See Attachment D for soil sample results of Pre-Remedial Assessment and Removal Action Assessment. The other samples were soil samples collected on the low gamma surveyed areas of the property to document background conditions. Per the 2015 EPA Removal Site Evaluation data, the maximum concentrations of the radionuclides of concerned in the outdoor samples were Ra-226 at 77.7 pCi/g and Ra-228 at 65.3 pCi/g. The extent of depth of contamination was determined to be at a two foot depth where majority of elevated exposure rates was due to the slag located in the first foot depth of the exterior surface.

In addition to exterior samples, interior swipe samples were collected inside the chapel building to determine if elevated readings were due to contamination being tracked into the buildings. No contamination was found inside the structure.

The U.S. Environmental Protection Agency (EPA) issued guidance entitled "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination" (OSWER No. 9200.4-18, August 22, 1997). This 1997 guidance provided clarification for establishing protective cleanup levels for radioactive contamination at CERCLA sites. As outlined in 40 CFR § 300.430(e)(2)(I)(A)(1), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provides that, for carcinogens, preliminary remediation goals should generally be set at levels that represent an upper-bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} when Applicable or Relevant and Appropriate Requirements (ARARs) are not available or are not sufficiently protective.

Since removal actions are not a part of the remedial program, removal is not mandated to meet the risk requirements of 10-4 to 10-6 for site cleanups. However, in recent years, EPA has

encouraged removal cleanups to meet, at a minimum, the remedial cleanup values associated with the 10-4 carcinogenic risk based on the reasonable maximum exposure for an individual. To determine if contamination levels exceed the cancer risk of 10-4 (i.e. 1 in 10,000 of cancer), a risk assessment must be performed. EPA's Preliminary Remediation Goal (PRG) Calculator was created to help calculate risk vs. cleanup levels for various receptors taking into consideration exposures from all potential pathways, and through all media (e.g., soil, ground water, surface water, sediment, air, structures, etc.). The most conservative receptor used for determining the cleanup values for the removal was the scenario involving a composite worker whose daily duties included both indoor and outdoor activities. The cleanup value established for the site, based on an increase of 10-4 cancer risk, are:

Radium-226 at levels in excess of 4.06 picocuries per gram (pCi/g)
Radium-228 at levels in excess of 26.30 picocuries per gram (pCi/g)

2. Physical Location and Site Characteristics

The Site is comprised of one building and a cemetery. The building is utilized as a chapel, residence and cemetery maintenance facility. The Union Carbide Facility (400 47th Street, Niagara Falls, NY 14304) is 5.3 miles from the Holy Trinity Cemetery Site. The Union Carbide facility processed ore containing naturally-occurring high levels of uranium and thorium to be classified as a licensable radioactive source material. Union Carbide subsequently obtained a license from the Atomic Energy Commission, now the Nuclear Regulatory Commission (NRC), and the State of New York; however, the slag had been used as fill throughout the Niagara Falls region prior to licensing. Based on the original survey and subsequent investigations, it is believed that the radioactive Union Carbide slag was deposited onto the Site.

The removal action (RV1) documented in this Action Memorandum will be the first CERCLA removal action undertaken at the Site.

3. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

The release and/or further threat of release, of the contaminants of Ra-226 and Ra-228 into the environment may impact the health of the public at the Site by a variety of pathways including inhalation from dusts and gases, ingestion from dusts, soils, water, as well as, direct radiation from external doses of alpha, beta, and gamma radiation from a particulate radioactive material. Workers at Holy Trinity Cemetery, as well as the passerby, patrons and merchants, and the public at or near the Site are being exposed to contamination via routes of inhalation or dermal contact to loose soils and windblown dust in the areas of concern.

Hazardous Substances Statutory Source for Designation Under CERCLA:

Radiological Substances Identified	Maximum Concentration
Radium 226 (Ra-226)	360 pCi/g
Radium 228 (Ra-228)	303 pCi/g

Each of the radiological substances listed above are listed in 40 CFR 302.4, List of Hazardous Substances and Reportable Quantities, Appendix B – Radionuclides. The statutory source for designating Radionuclides as a hazardous substance is Section 112 of the Clean Air Act.

III. THREATS TO PUBLIC HEALTH WELFARE OR THE ENVIRONMENT

A. Nature of Actual or Threatened Release of Hazardous Substances, Pollutants or Contaminates

Section 300.415(b) of the NCP states:

"At any release, regardless of whether the site is included on the National Priorities List (NPL), where the lead agency makes the determination, based on the factors in paragraph (b)(2) of this section, that there is a threat to public health or welfare of the United States or the environment, the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release."

Based on the factors in paragraph Section 300.415(b)(2), the following factors justify a removal action at the Site:

B. Check Applicable Factors (From 40 CFT 300.415) Which Were Considered in Determining the Appropriateness of a Removal Action

__X__ Actual or potential exposure to nearby human populations, animals or the food chain from hazardous substances, or pollutants, or contaminants [300.415(b)(2)(i)].

__X__ Actual or potential contamination of drinking water supplies or sensitive ecosystems [300.415(b)(2)(ii)].

_____ Hazardous substances or pollutants or contaminates in drums, barrels, tanks, or other bulk storage containers, that pose a threat of release [300.415(b)(2)(iii)].

__X__ High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate [300.415(b)(2)iv)].

__X__ Weather conditions that may cause hazardous substances or pollutants to migrate or be released [300.415(b)(2)(v)].

__X__ Threat of fire or explosion [300.415(b)(2)(vi)].

__X__ The lack of availability of other appropriate federal or state response mechanism to respond to the release [300.415(b)(2)(vii)].

_____ Other situations or factors that may pose threats to the public health or welfare of the United States or the environment [300.415(b)(2)(viii)].

IV. SELECTED REMOVAL ACTION AND ESTIMATED COSTS

A. Situation and Removal Activities to Date

1. Current Situation: In August 2015, EPA performed additional survey and soil sampling at the Site. The analytical results of these samples indicated the areas of concern contained CERCLA designated hazardous substances. These areas are being frequented by trespassing public member.

2. Removal Activities to Date: On **DATE**, a verbal authorization was granted by the ERRD Director to conduct an emergency response action at this site. EPA activated the Emergency and Rapid Response Services (ERRS) contractor the same day. ERRS has solicited bids for fence installation.

3. Enforcement: The Diocese of Buffalo has been identified as the current owner of the property containing areas of contamination. The Diocese does not appear to have the resources to take a timely response action at this Site. Union Carbide is believed to be the source of the contaminated material placed on the Site.

B. Planned Removal Actions

1. Proposed Action Description: EPA anticipates that ERRS will mobilize by April 18, 2016, to install fence around the perimeter of the two identified areas of contamination in order to secure the Site. ERRS will also need to clear grass, brush and trees for installation of fence and future assessment access.

2. Contributions to Remedial Performance: The proposed actions will, to the extent practicable, contribute to the efficient performance of the anticipated removal action at the Site.

3. Applicable or Relevant and Appropriate Requirements ("ARARs"): Section 300.415(j) of the NCP provides that removal actions must attain ARARs to the extent practicable, considering the exigencies of the situation. ARARs are defined, per Section 300.5 of the NCP, as applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at the CERCLA site.

It remains EPA's policy that ARARs will generally be considered protective absent of multiple contaminants or pathways of exposure. There are some incidents, especially with the properties located at 5401 Roberts Avenue, that establishing a site specific PRG would be more protective than using the UMTRCA ARAR for radium-226 and Ra-228 of 5pCi/g of radium for soil contamination at uranium mill tailing sites. Site specific PRG numbers were calculated. The highest risk receptor was used in determining the most conservative value for cleanup values of the Site.

4. Project Schedule: EPA anticipates that ERRS will mobilize by April 18, 2016, to install fence around the perimeter of the two identified areas of contamination to secure the Site.

C. Estimated Costs*

Contractor Costs (ERRS)	$48,000
Other Extramural Costs (RST)	$5,000
Contingency Costs	$5,300
Total Removal Project Ceiling	$58,300

*EPA direct and indirect costs, although cost recoverable, do not count toward the Removal Ceiling for this removal action. Liable parties may be held financially responsible for costs incurred by the EPA as set forth in Section 107 of CERCLA.

V. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

A delay in action or no action at this Site would increase the actual or potential threats to the public health and/or the environment.

VI. OUTSTANDING POLICY ISSUES

None

VII. APPROVALS

This decision document represents the selected removal action for this Site, developed in accordance with CERCLA as amended, and is not inconsistent with the National Contingency Plan ("NCP"). This decision is based on the administrative record for the Site. Conditions at the Site meet the NCP Section 300.415(b) criteria for a removal action. This document confirms the verbal authorization provided on **Date** for the removal action at the Holy Trinity Site. A total project ceiling of **$X0,000** was authorized, of which **$X0,000** was for mitigation contracting. This project was funded from the Regional Removal Allowance.

VIII. ENDANGERMENT DETERMINATION UNDER CERCLA SECTION 106: HAZARDOUS SUBSTANCES:

Actual or threatened releases of hazardous substances from this Site may present an imminent and substantial endangerment to public health or welfare, or the environment.

_____ _____

Walter E. Mugdan, Director Date
Emergency and Remedial Response Director

After Approval:

Cc: W. Mugdan, ERRD-D
A. Carpenter, ERRD-DD
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